

## Geometry 3-6 Notes: Lines in the Coordinate Plane (pp 190-193)

### Forms of the Equation of a Line

FORM	EXAMPLE
The <b>point-slope form</b> of a line is $y - y_1 = m(x - x_1)$ , where $m$ is the slope and $(x_1, y_1)$ is a given point on the line.	$y - 3 = 2(x - 4)$ $m = 2, (x_1, y_1) = (3, 4)$
The <b>slope-intercept form</b> of a line is $y = mx + b$ , where $m$ is the slope and $b$ is the y-intercept.	$y = 3x + 6$ $m = 3, b = 6$
The equation of a vertical line is $x = a$ , where $a$ is the x-intercept.	$x = 5$
The equation of a horizontal line is $y = b$ , where $b$ is the y-intercept.	$y = 2$

Write the formula for the following linear equations:

1. slope-intercept

2. point-slope

3. Standard form

Write the equation of each line in the given form.

4. The line through  $(-4, 2)$  with slope  $\frac{3}{4}$  in point-slope form.

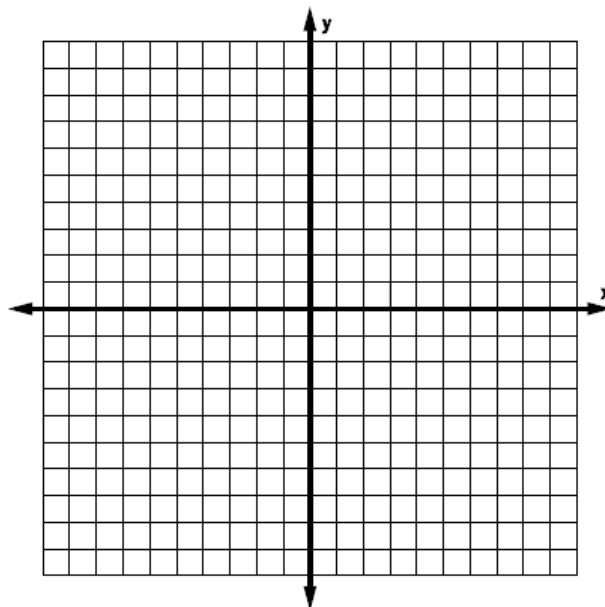
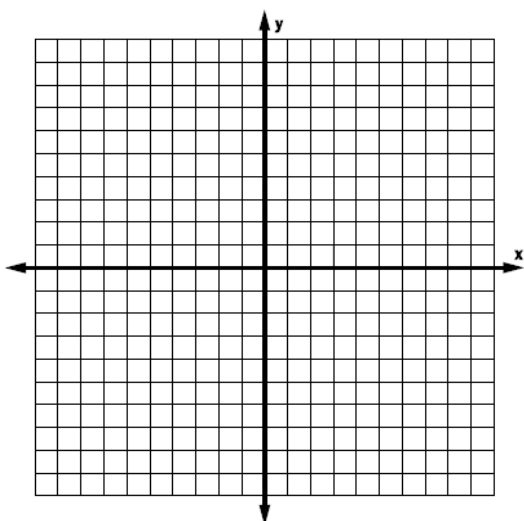
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5. The line with x-intercept 4 and y-intercept -2 in slope-intercept form

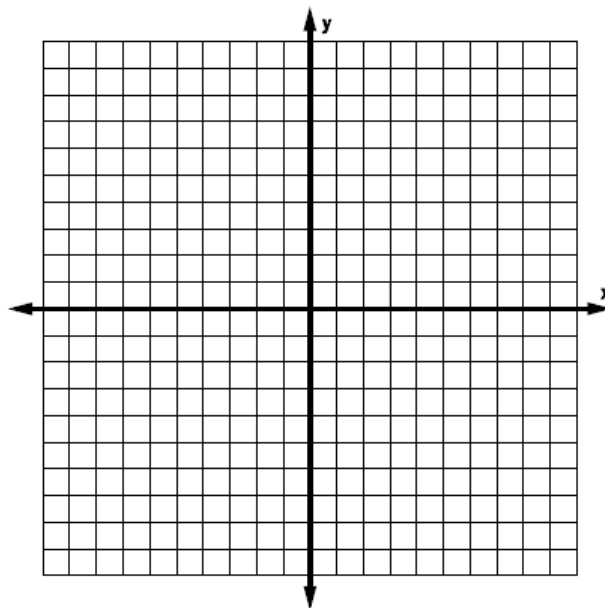
**Graph each line.**

6.  $y = -3x + 4$

7.  $y + 4 = \frac{2}{3}(x - 6)$



8.  $x = 5$



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### Pairs of Lines

PARALLEL LINES	INTERSECTING LINES	COINCIDING LINES
$y = 5x + 8$ $y = 5x - 4$	$y = 2x - 5$ $y = 4x + 3$	$y = 2x - 4$ $y = 2x - 4$
Same <b>slope</b> different <b>y-intercept</b>	Different <b>slopes</b>	Same <b>slope</b> , same <b>y-intercept</b>

9. How can you tell if two lines are parallel, intersecting or coinciding?

Determine whether the lines are parallel, intersect, or coincide:

10.  $6x - 12y = -24$   
 $3y = 2x + 18$

11.  $y = \frac{1}{3}x + \frac{2}{3}$   
 $3y = x + 2$

12.  $4x + 2y = 10$   
 $y = -2x + 15$

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**13.** A speeding ticket in Conroe costs \$115 for the first 10 mi/h over the speed limit and \$1 for each additional mi/h. In Lakeville, a ticket costs \$50 for the first 10 mi/h over the speed limit and \$10 for each additional mi/h. If the speed limit is 55 mi/h, at what speed will the tickets cost approximately the same?

**14.** How can you tell if an equation is written in slope-intercept form?

**15.** Explain how to use the slopes and y-intercepts to determine if two lines are parallel.

**16.** Describe the relationship between the slopes of perpendicular lines.

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